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A comparative study of oxycodone and morphine in a multi-modal, tissue-differentiated experimental pain model

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Abstract

Visceral pain can be difficult to treat with classical μ-opioid agonists and it has been suggested to use opioids with distinct pharmacological profiles. In animal experiments, oxycodone has shown different effects compared to morphine, and clinical observations have shown that oxycodone may occasionally be superior to, e.g., morphine in the treatment of visceral pain. In the current study, we randomised 24 healthy subjects to treatment with either morphine (30 mg), oxycodone (15 mg) or placebo in a crossover study. The experimental pain model involved multi-modal (mechanical, thermal and electrical) pain tests in the skin, muscles and viscera. The pain tests were carried out at baseline and 30, 60 and 90 min after oral administration of the drugs. The model showed effect of the two opioids compared to placebo on all stimulus modalities in all three types of tissues (all P values <0.001). Both opioids attenuated the sensory response mainly to painful stimulations. Morphine and oxycodone were equipotent in pain modulation of the skin and muscles, but oxycodone had superior analgesic effect to both morphine and placebo on the mechanical ($P < 0.001$) and thermal ($P < 0.001$) stimulations of the oesophagus. In conclusion, the multi-modal and tissue-differentiated pain model could link findings from animal experiments to clinical findings. A different pharmacological profile of oxycodone compared to that of morphine was shown, and thus oxycodone may be a useful alternative to morphine in the treatment of visceral pain syndromes.

Keywords

Experimental pain; Visceral pain; Oxycodone; Morphine

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